

No.

200300229



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## National Agricultural Research Organization

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

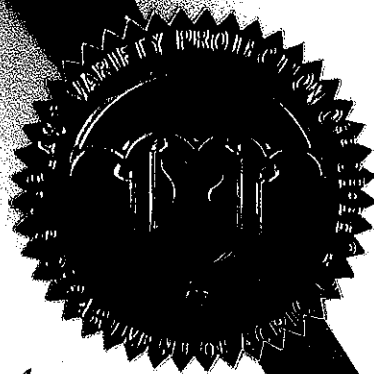
'L-Star'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-seventh day of April, in the year two thousand and five.

Attest:

Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

Secretary of Agriculture



REPRODUCE LOCALLY. Include form number and date on all reproductions

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE <b>APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE</b> <i>(Instructions and information collection burden statement on reverse)</i>		The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995. Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2428).	
1. NAME OF OWNER  National Agricultural Research Organization		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME	
3. VARIETY NAME  L-Star		4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 1-1, Kannondai 3-chome, Tsukuba-shi, Ibaraki, JAPAN (BT: 2/18/2005)	
5. TELEPHONE (include area code) (029) 838-8998, or (029) 838-8511 (BT: 2/18/2005)		6. FAX (include area code) (029) 838-8989 (BT: 2/18/2005)	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.)  Independent Administrative Institute		8. IF INCORPORATED, GIVE STATE OF INCORPORATION  JP	
9. DATE OF INCORPORATION  April 1, 2001		10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers)  Mr. J. Derek Mason Oblon, Spivak, McClelland, Maier & Neustadt, PC 1940 Duke St. Alexandria, VA 22314	
11. TELEPHONE (include area code) (703) 413-3000		12. FAX (include area code) (703) 413-2220	
13. E-MAIL dmason@oblon.com		14. CROP KIND (Common Name) Soybean	
15. FAMILY NAME (Botanical) Leguminosae		16. GENUS AND SPECIES NAME OF CROP Glycine max (L.) Merr.	
17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input type="checkbox"/> NO IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.	
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)		20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input type="checkbox"/> YES (If "yes", answer items 21 and 22 below) <input checked="" type="checkbox"/> NO (If "no", go to item 23)	
a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)		23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)	
24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)		25. The owner declares that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believes that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.	

FOR OFFICIAL USE ONLY

PVPO NUMBER  
**200300229**

FILING DATE  
**4/30/2003**

FILING AND EXAMINATION FEES:  
\$ **3,652.00**  
DATE **4/30/2003**  
CERTIFICATION FEE:  
\$ **432.**  
DATE **9-24-05**

SIGNATURE OF OWNER REPRESENTATIVE

NAME (Please print or type)

J. Derek Mason

CAPACITY OR TITLE

Representative

DATE

9/29/04

SIGNATURE OF OWNER

NAME (Please print or type)

CAPACITY OR TITLE

DATE

(See reverse for instructions and information collection burden statement)

**GENERAL:** To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (in the sense that it will reproduce an entire plant) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvpindex.htm>

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 <http://www.ams.usda.gov/lsg/seed.htm>.

## ITEM

- 19a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) evidence of uniformity and stability; and (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
  - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
  - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
20. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See *Regulations and Rules of Practice, Section 97.103*).
23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

JAPAN Plant Breeder's Right Certificate, Registration Date: February 9, 2001, Registration No. 8646

**NOTES:** It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audio tape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

EXHIBIT A

'L-Star' soybean was developed by Kyushu Agricultural Experimental Station (KNAES), Japan, for transfer of a unique seed trait to the widely grown cultivar 'Fukuyutaka' (P1506675, USDA germplasm collection) in Kyushu district. 'L-Star' has the *lox1lox1*, *lox2lox2* and *lox3lox3* genotypes, thereby lacking triple lipoxxygenase isozymes in its seeds.

The pedigree of 'L-Star' is shown in Fig A1 provided with the present application as part of Exhibit A. "Ichime" and "Yumeyutaka" are breeding varieties protected under Seed and Seeding Law (the Japanese Plant Variety Right), and are commercially available varieties. "Suzuyutaka" is also a breeding variety protected under Seed and Seeding Law and is commercially available. "Wasenatsu", "PI408251" and "PI86023" are publically available and stored at the National Institute of Agrobiological Sciences in Japan as genetic resources. Further, the varieties identified by "PI" numbers, as well as "Wasenatsu", are all part of the USDA germplasm collection. "Kanto102" itself is not publically available, but has been traced back to publically available lines. 'Kyuko506', 'Kyuko548' and 'Kyuko548' are names of crosses, 'Fukuyutaka' x 'Ichihime', 'Fukuyutaka' x 'F<sub>2</sub> of Kyuko506' and 'Murayutaka' x 'BC<sub>1</sub>F<sub>2</sub> of Kyuko 548', respectively.

'L-Star' originated by single-seed selection from F<sub>2</sub> bulk seeds of 30 F<sub>1</sub> plants grown in an experimental field at KNAES in summer 1992 (Table A2) which derived from the cross 'Murayutaka' x 'Kyuko 548' made in spring 1992. The triple null lipoxxygenase seeds were selected by sodium dodecyl sulfate polyacryamide gel electrophoresis (SDS-PAGE) of the seed protein using a small part of cotyledon without critical damage on their viability. 'Murayutaka' is a cultivar derived from the mutants of EMS-treated 'Fukuyutaka'. It differs in having clear hilum on it's seeds from 'Fukuyutaka' with tan hilum. Kyuko 548' is triple null lipoxxygenase F<sub>2</sub> selected by SDS-PAGE's single-seed selection from the F<sub>2</sub> bulk seeds from the backcross, 'Fukuyutaka'<sup>2</sup> x 'Ichihime' (Fig A1). 'Fukuyutaka', having the *Lox1Lox1*, *Lox2Lox2* and *Lox3Lox3* genotypes, originated from an individual F<sub>5</sub> plant selection from the cross 'Okadaizu' x 'Shirodaizu 3'. 'Okadaizu'

(PI594241, USDA germplasm collection) is a native variety in Kyushu district, Japan, and 'Shirodaizu 3' (PI417319, USDA germplasm collection) is inbred line selected from the native varieties in Okayama Prefecture, Japan. 'Ichihime' is a triple null lipooxygenase cultivar derived by SDS-PAGE's single seed selection from  $M_3$  seeds originated from the mutation induced  $F_2$  progeny ( $M_1$ ) of the cross 'Kanto102' x 'Yumeyutaka' (Fig. A). The  $F_2$  seeds were irradiated by gamma ray for the break-down of close linkage between *Lox1* and *lox2* or *lox1* and *Lox2*. 'Kanto102' is a double null lipooxygenase line having the *lox1lox1*, *Lox2Lox2* and *lox3lox3* genotypes. It was selected from a single  $F_2$  seed selected by SDS-PAGE from the cross of  $BC_4F_2$  having *lox3lox3* genotype x  $BC_3F_3$  having *lox1lox1* genotype (Fig. A). 'Suzuyutaka' (PI561395, USDA germplasm collection), grown in Tohoku district, Japan, having the *Lox1Lox1*, *Lox2Lox2* and *Lox3Lox3* genotypes is the recurrent parent of the backcross. The *lox1lox1* and *lox3lox3* genotypes originated from 'PI408251' (USDA germplasm collection), and 'Wasenatsu' (native variety in Japan, PI417458 USDA germplasm collection) respectively (Fig. A). 'Yumeyutaka' is a double null lipooxygenase variety having the *Lox1Lox1*, *lox2lox2* and *lox3lox3* genotypes. It was selected from a single  $F_2$  seed selected by SDS-PAGE from the cross of  $BC_3F_3$  having *lox2lox2* genotype x  $BC_4F_2$  having *lox3lox3* genotype (Fig. A). 'Suzuyutaka' is used again as the recurrent parent of the backcross. The *lox2lox2* and *lox3lox3* genotypes originated from 'PI86023' (USDA germplasm collection) and 'Wasenatsu', respectively (Fig. A).

Seven triple null lipooxygenase  $F_2$  progeny were advanced in greenhouse and selected by the seed bulk method at KNAES in spring 1993 (Table A). 'L-Star' was selected from a single  $F_3$  plant grown in the experimental field at KNAES in summer of 1993. The line selection method was applied for the selection of  $F_4$  and the consecutive generations since summer 1994. Five plants were selected from the single plants-rows out of five plants-rows of  $F_4$ ,  $F_5$  and  $F_6$  in summer 1994, 1995 and 1996, respectively. They were evaluated on their agronomic traits and used as five lines at the next generation. Genetic stability in these 5 lines was confirmed in summer 1996, because the genetic variation in main agronomic traits, i.e. flowering date, maturity date, main stem length, number of main stem nodes, number of branches and 100 seed weight were less

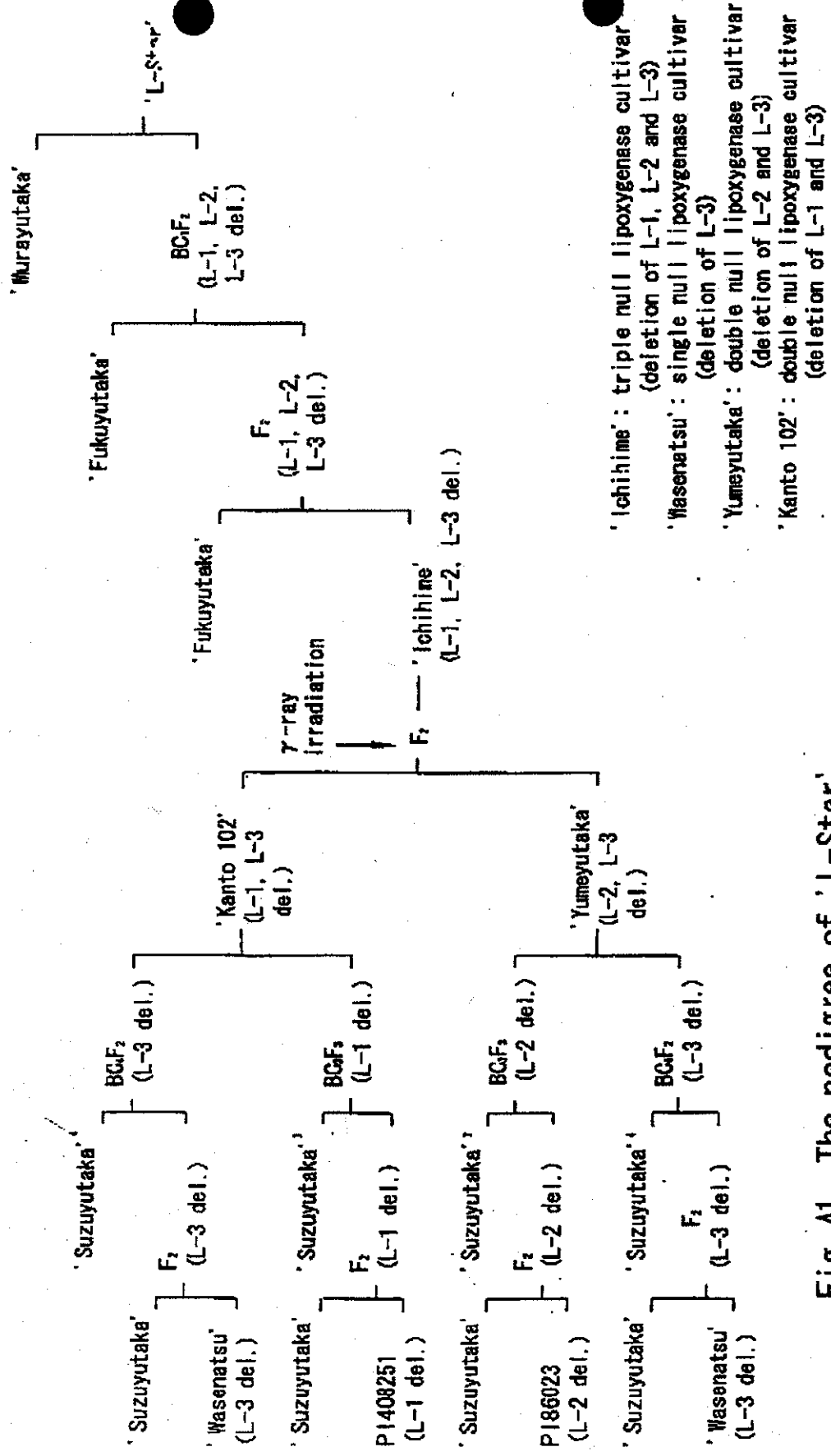


Fig.A1. The pedigree of 'L-Star'

TABLE A2

Table A2 Breeding history of 'L-Star'

Year	1990		1991		1992		1993		1994	1995	1996
Season	Spring	Summer	Spring	Summer	Spring	Summer	Spring	Summer	Summer	Summer	Summer
Generation	Cross <sup>a</sup>	F <sub>1</sub>	Backcross <sup>b</sup>	BC <sub>1</sub> F <sub>1</sub>	Cross <sup>c</sup>	F <sub>1</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>
No. of the planted	Kyuko506	30 plants	Kyuko548	21 plants	Kyuko582	30 plants	7 plants	30 plants	5 lines	5 lines	5 lines
No. of the selected	30 seeds	2 F <sub>1</sub> seeds	21 seeds	8 BC <sub>1</sub> F <sub>1</sub> seeds	30 seeds	7 F <sub>2</sub> seeds	30 seeds	5 plants	5 plants from single line	5 plants from single line	5 plants from single line
Selection	Fertilized seeds only	Single seed selection	Fertilized seeds only	Single seed selection	Fertilized seeds only	Single seed selection	Bulk seed selection	Single plant selection	Line selection	Line selection	Line selection
Criteria for selection		Triple null lox		Triple null lox		Triple null lox	Triple null lox	Agro-nomic traits	Agro-nomic traits	Agro-nomic traits	Agro-nomic traits
Expt. place	Green house	Field	Green house	Field	Green house	Field	Green house	Field	Field	Field	Field

<sup>a</sup> Kyuko506 is 'Fukuyutaka' × 'Ichihime'<sup>b</sup> Kyuko548 is 'Fukuyutaka' × 'F<sub>2</sub> of Kyuko506'<sup>c</sup> Kyuko582 is 'Muryutaka' × 'BC<sub>1</sub>F<sub>2</sub> of Kyuko548'

Triple null lox (triproxygenase isozymes) was selected by SDS-PAGE

than 5% among the five  $F_6$  plants-rows, and similar to those of 'Fukuyutaka', widely grown in Kyushu district (Table A3)

Evaluations of agronomic traits, disease resistance and seed yield were conducted at more than 10 prefectural agricultural experiments stations during 1996 through 2000. Variety registration of 'L-Star' was applied to the Ministry of Agriculture, Forestry and Fisheries of Japan in 1997 and has been approved in 2001 as Registration No. 8646 (a copy of the Certificate of Registration is attached to the present application).

'L-Star' had been observed for 5 generations ( $F_6$  through  $F_{10}$ ) of reproduction and during the seed increase period and is stable and uniform (Table A4). 'L-Star' shows no variants for all traits described in Exhibit C (Objective Description of Variety).



Table A  
UNIFORMITY AND STABILITY OF 'L-STAR' ON QUANTITATIVE CHARACTERS

QUANTITATIVE CHARACTERS		1996	1997	1998	1999	2000
Main stem length (cm)	Average	63.5	38.2	55.1	66.7	67.3
	Standard Deviation	3.0	2.0	1.5	3.0	2.4
	Variation coefficient (%)	4.7	5.3	2.8	4.5	3.6
No. of main stem nodes	Average	14.7	13.5	14.9	16.0	16.2
	Standard Deviation	0.2	0.1	0.2	0.4	0.2
	Variation coefficient (%)	1.5	0.4	1.3	2.7	1.0
No. of primary branches	Average	3.7	4.0	5.2	4.4	4.0
	Standard Deviation	0.3	0.7	0.2	0.1	0.4
	Variation coefficient (%)	7.2	16.2	3.4	2.3	10.2
100 seed weight (g)	Average	25.8	24.7	28.1	21.1	31.9
	Standard Deviation	0.9	0.8	0.3	0.5	0.7
	Variation coefficient (%)	3.4	3.2	1.0	2.4	2.3
Days to Flowering (days)	Average	39.0	39.0	42.0	44.0	43.0
	Standard Deviation	0.0	0.0	0.0	0.0	0.0
	Variation coefficient (%)	0.0	0.0	0.0	0.0	0.0
Days to Maturity (days)	Average	105.3	100.3	111.0	109.0	121.0
	Standard Deviation	0.6	0.6	0.0	0.0	1.7
	Variation coefficient (%)	0.5	0.6	0.0	0.0	1.4

Note: Materials and methods are described in Exhibit B except for the planting dates in 1997 and 1999, which were July 15, 1997 and July 6, 1999.

Average and Standard Deviation: Average and its standard deviation of 3 replicates (20 measurement per replicates)

Higher variations in 1997 were due to severe infection for soybean cyst nematode (*Heterodera glycines* Ichinohe)

Table A3 The genetic stability of 'L-Star'

Name of variety		Number of individual	Flowering date (mon./day)	Maturity date (mon./day)	Main stem length (cm)			Number of main stem nodes			Number of branches			100 seed weight (g)		
					Average	Standard deviation	Mutation factor (%)	Average	Standard deviation	Mutation factor (%)	Average	Standard deviation	Mutation factor (%)	Average	Standard deviation	Mutation factor (%)
'L-Star'	-1	10	Aug. 18	Oct. 24	66.1	2.5	3.8	14.7	0.8	5.3	4.1	0.7	17.1	24.9	1.2	11.9
	-2	10	Aug. 18	Oct. 24	66.4	2.4	3.6	15.1	0.7	4.6	4.2	0.8	17.8	24.3	1.2	12.0
	-3	10	Aug. 19	Oct. 24	64.8	3.1	4.7	14.9	1.1	7.6	3.9	0.7	18.0	26.1	1.4	13.8
	-4	10	Aug. 18	Oct. 24	63.3	3.5	5.6	14.6	0.5	3.4	3.9	0.7	18.0	24.3	1.2	11.8
	-5	10	Aug. 18	Oct. 24	63.5	2.5	3.9	14.8	0.6	4.1	4.3	0.6	14.9	25.7	1.0	10.3
Pedigree average			Aug. 18	Oct. 24	64.8			14.8			4.1			25.1		
Mutation factor between pedigree (%)					2.2			1.5			4.4			3.3		
'Fukuyutaka'	-1	10	Aug. 18	Oct. 24	62.5	2.7	4.4	14.7	0.8	5.3	4.4	0.9	20.8	27.1	1.5	15.0
	-2	10	Aug. 19	Oct. 24	62.6	2.5	3.9	14.7	1.0	6.8	3.9	0.7	18.0	25.5	1.0	9.7
	-3	10	Aug. 18	Oct. 24	67.6	3.9	5.7	14.0	1.6	11.5	3.9	0.7	18.0	24.7	0.7	7.0
	-4	10	Aug. 19	Oct. 24	67.2	4.8	7.2	14.8	1.4	9.5	4.0	0.6	15.8	25.3	1.6	15.7
	-5	10	Aug. 18	Oct. 24	65.6	2.7	4.0	15.3	0.8	5.1	4.1	0.7	17.1	26.5	1.1	11.0
Pedigree average			Aug. 18	Oct. 24	65.1			14.7			4.1			25.8		
Mutation factor between pedigree (%)					3.8			3.2			5.1			3.7		
'Toyoshirome'	-1	10	Aug. 17	Oct. 27	60.9	2.3	3.8	14.4	0.7	4.6	4.3	0.6	14.9	27.1	1.1	10.9
	-2	10	Aug. 18	Oct. 27	56.9	5.7	10.0	14.2	1.1	7.6	4.4	0.7	15.1	27.3	1.3	12.8
	-3	10	Aug. 18	Oct. 27	63.2	4.5	7.1	14.5	0.5	3.5	4.3	0.8	18.2	27.0	1.3	12.6
	-4	10	Aug. 18	Oct. 27	62.1	6.1	9.8	14.2	0.8	5.3	4.8	0.9	18.2	27.7	1.1	11.5
	-5	10	Aug. 18	Oct. 27	61.3	4.4	7.2	13.9	0.9	6.8	5.0	0.6	12.7	27.9	1.5	14.8
Pedigree average			Aug. 18	Oct. 27	60.9			14.2			4.6			27.4		
Mutation factor between pedigree (%)					3.9			1.6			7.0			1.4		

- Remarks: 1) Pedigree with circuled pedigree number is the selected pedigree.  
 2) 'Fukuyutaka' and 'Toyoshirome' are widely grown in Kyushu district.  
 3) Seeding: July 10  
 Culture density: width of footpath is 70 cm; interval between plants is 14 cm;  
 one piece for one plant and 10.2 pieces/m<sup>2</sup>

## Exhibit B

Quantitative characters associated with plant and seed sizes, and major chemical components in seeds

### 1. Cultivation

The experiment was conducted in the summers of 1996, 1998 and 2000 at the National Agricultural Research Center for Kyushu and Okinawa Region, Nishigoshi, Kumamoto (32° 52' N, 130° 44' E, 85m above sea level). 'Fukuyutaka' was used as the most similar previously existing variety to 'L-Star', because 'Fukuyutaka' was the recurrent parent in the breeding and is a leading cultivar in Kyushu region where 'L-Star' is supposed to be well-adapted. Soil series was heavy clay, which is characterized by large amount of organic matter, well drainage, but high capability of P fixation. 100g m<sup>-2</sup> of calcium carbonate and 3, 10 and 10 g m<sup>-2</sup> of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, respectively, were applied to the experimental site before the planting. The experimental design was a randomized complete block in three replicates. 'L-Star' and 'Fukuyutaka' were planted in five 0.7m-wide and 2.25m long rows on the 10th, 4th, 7th of Julys in 1996, 1998, and 2000, respectively. The plant space was adjusted to 14 cm in row around 2 weeks after the planting. Weed was controlled twice before flowering by inter-row tillage. The experimental site was not irrigated but plants did not show so severe water deficiency to affect the quantitative characters measured here, because of regular rainfall during the growing season.

### 2. Measurement

Flowering and maturing dates of the two cultivars were recorded for each replicate. Main stem length, numbers of main stem nodes and primary branches were measured for 20 plants harvested from each replicate at maturity stage; 100 seed weight, protein and oil contents in seeds, and seed shape were determined from the seed bulk of around 70 plants from each replicate. Three 100 seeds were sampled from the seed bulk of each replicates to determine 100 seed weight; around 20g of seeds were milled by Cyclone Sample Mill (Udy Cooperation, Fort Collins, CO) and screened in a sieve (diameter: 1mm) for the analysis of protein and oil contents by near infrared reflectance spectroscopy. Seed dimension (length, width and thickness) were measured for the 50 seeds sampled from the seed bulk of each replicates to determine seed shape in 1996 and 1998.

### 3. Statistic analysis

Analysis of variance was used to evaluate the significance of cultivar's difference. If no asterisk symbol is given, then difference did not have a significant difference at P 0.05.

#### 4. Description of characters

- 1) 'L-Star' flowered on the same date as 'Fukuyutaka' (days to flowering: 41.3 vs. 41.3) across the three years (Table 61). 'L-Star' matured 0.9 days earlier (days to maturing: 112.4 vs. 113.3), although the difference was not significant at  $P \leq 0.05$  (Table 62).
- 2) 'L-Star' had a longer main stem than 'Fukuyutaka' across the three years; however, the difference was not significant (Table 63). 'L-Star' had more main stem nodes than 'Fukuyutaka' in 1998 (14.9 vs. 14.0, significantly different at  $P \leq 0.05$ ); however, 'L-Star' had similar number of main stem nodes in the other years (14.7 vs. 14.7 in 1996, 16.2 vs. 16.3 in 2000) (Table 64). 'L-Star' had less primary branch across years (4.2 vs. 4.8), although the difference was significant only in 1996 (Table 65).
- 3) 'L-Star' had larger seeds than 'Fukuyutaka' across years, although the difference was significant only in 1996 (Table 66). 'L-Star' had smaller dimension than 'Fukuyutaka' except for the width in 1996, although the difference was not significant at  $P \leq 0.05$  (Table 67). 'L-Star' had a elongate seed shape in both 1996 and 1998; however, 'Fukuyutaka' had a elongate in 1996 but spherical seed shape in 1998. (Table 68).
- 4) 'L-Star' had similar amount of protein in its seeds to 'Fukuyutaka' (Table 69). 'L-Star' always had higher oil content than 'Fukuyutaka', although the difference was not significant at  $P \leq 0.05$  (Table 70).

Consequently, 'L-Star' was most similar to 'Fukuyutaka'; in plant size and seed quality, because 'L-Star' did not have any consistent difference with 'Fukuyutaka' in the quantitative plant and seed characters measured in the three years' experiment at KONARC, Kumamoto, Japan.

ADDENDUM TO EXHIBIT B

Originally filed Exhibit B should be corrected on item 3) of its second page, first sentence, to indicate:

"3) 'L-Star' had smaller seeds than 'Fukuyutaka' across years, although the difference was significant only in 1996 (Table ~~86~~)." ~~86~~

The present variety 'L-Star' shows the following differences from the closest variety "Fukuyutaka":

- a. Lipxygenase 1, 2 and 3 are all absent in 'L-Star', but all present in "Fukuyutaka".
- b. The hilum color of 'L-Star' is yellow, while the hilum color of "Fukuyutaka" is pale brown.
- c. The seed shape of 'L-Star' is elongate. (Applicants note that a revised Exhibit C is also provided herewith making this correction). The seed shape of "Fukuyutaka" in 1996 was elongate, but in 1998 was spherical.

Table 61. Days to flowering

Variety	Experiment Year			Average
	1996	1998	2000	
L-Star	39.0	42.0	43.0	41.3
Fukuyutaka	39.0	42.0	43.0	41.3
F value				
Cultivars	-	-	-	
Blocks	-	-	-	

Note: Flowering date is determined as more than 50% plants begin to flower.

F value was not able to be culculated, because no variant among 2 cultivars and 3 blocks over the three seaosns of 1996, 1998 and 2000.

Table 62. Days to maturing

Variety	Experiment Year			Average
	1996	1998	2000	
L-Star	105.3	111.0	121.0	112.4
Fukuyutaka	107.3	111.3	121.3	113.3
F value				
Cultivars	4.000	0.143	0.053	
Blocks	0.778	1.000	0.684	

Note: Maturing date was determined as more than 80% plants reach physilological maturity.

F values at 1 and 5 % P were 98.5 and 18.5, respectively, for the statistical significant difference between two cultivars, and 99.0 and 19.0, repectively, among three replicated blocks.

Table 83 Main Stem length (cm).

Variety	Experiment Year			Average
	1996	1998	2000	
L-Star	63.5	55.1	67.3	62.0
Fukuyutaka	64.3	49.3	65.2	59.6
F value				
Cultivars	0.105	11.9	11.6	
Blocks	0.586	0.831	12.6	

Note: main stem length was measured from the cotyledonary node to the uppermost node of main stem.

F values at 1 and 5 % *P* were 98.5 and 18.5, respectively, for the statistical significant difference between two cultivars, and 99.0 and 19.0, respectively, among three replicated blocks.

Table 84 Number of main stem nodes.

Variety	Experiment Year			Average
	1996	1998	2000	
L-Star	14.7	14.9	16.2	15.3
Fukuyutaka	14.7	14.0	16.3	15.0
F value				
Cultivars	0.053	972.0**	0.662	
Blocks	0.010	72.3*	0.258	

Note: F values at 0.05 and 0.01 *P* were 18.5 and 98.5, respectively, for the statistical significant difference between two cultivars, and 19.0 and 99.0, respectively, among three replicated blocks.

\*, \*\*: Significant difference ( $P < 0.05$  and  $P < 0.01$ , respectively) based based on an F test.

Table 85 Number of primary branches

Variety	Experiment Year			Average
	1996	1998	2000	
L-Star	3.6	5.2	3.8	4.2
Fukuyutaka	4.0	6.3	4.2	4.8
F value				
Cultivars	32.9*	0.697	0.185	
Blocks	11.1	0.669	0.313	

Note: Primary brach was regarded as it prodeuced more than two nodes on the main stem nodes.

F values at 0.05 and 0.01 *P* were 18.5 and 98.5, respectively, for the statistical significant differenc between two cultivars, and 19.0 and 99.0, repectively, among three replicated blocks.

\*: Significant difference ( $P < 0.05$ ) based based on an F test.

Table 86 100 seed weight (g) at the 15% moisture content.

Variety	Experiment Year			Average
	1996	1998	2000	
L-Star	25.8	28.1	31.9	28.6
Fukuyutaka	27.3	29.3	33.2	30.0
F value				
Cultivars	46.1*	2.104	3.642	
Blocks	26.6*	0.533	0.152	

Note: Primary brach was regarded as it prodeuced more than two nodes on the main stem nodes.

F values at 0.05 and 0.01 *P* were 18.5 and 98.5, respectively, for the statistical significant differenc between two cultivars, and 19.0 and 99.0, repectively, among three replicated blocks.

\*: Significant difference ( $P < 0.05$ ) based based on an F test.



Table 87 Seed dimension(mm).

Variety	1996			1998		
	Length	Width	Thickness	Length	Width	Thickness
L-Star	8.58	7.83	6.49	8.08	7.85	6.70
Fukuyutaka	8.70	7.78	6.63	8.41	8.00	7.05
F value						
Cultivars	1.990	0.814	2.518	9.41	7.42	7.10
Blocks	0.103	0.351	0.318	1.95	5.50	0.23

Table 88 Seed shape

Variety	1996				1998			
	L/W	L/T	T/W	Shape	L/W	L/T	T/W	Shape
L-Star	1.10	1.32	0.83	Elongate	1.03	1.21	0.85	Elongate
Fukuyutaka	1.12	1.31	0.85	Elongate	1.05	1.19	0.88	Spherical

Note: L, W, and T are length, width, and thickness, respectively of seed.

Seed shape is defined as follows:

Spherical: L/W, L/T, and T/W ratios < 1.2

Elongate: L/T ratio > 1.2; T/W ratio < 1.2

Spherical-Flattened: L/W ratio > 1.2; L/T ratio < 1.2

Table 9. Protein content(%) in seeds

Variety	Experiment Year			Avg
	1996	1998	2000	
L-Star	41.6	40.3	43.3	41.7
Fukuyutaka	42.2	40.5	42.5	41.7
F value				
Cultivars	7.84	0.64	3.76	
Blocks	0.21	6.27	0.88	

Note: InfraAnalyzer 500 (Bran+Leubbe GmbH, Norderstedt, Germany) was used for NIR analysis. The calibration curve for the determination of protein content had been made using data analyzed by semi-micro Kheldahl method at KONARC.

Table 10. Oil content(%) in seeds

Variety	Experiment Year			Avg
	1996	1998	2000	
L-Star	22.7	26.3	21.9	23.6
Fukuyutaka	21.7	25.1	21.7	22.8
F value				
Cultivars	10.61	12.64	0.92	
Blocks	0.14	2.73	3.29	

Note: InfraAnalyzer 500 (Bran+Leubbe GmbH, Norderstedt, Germany) was used for NIR analysis. The calibration curve for the determination of oil content had been made using data analyzed with hexanal by Soxhelt method (Sortex System HT 1043 Extraction Unit, Tecator, Hoganas, Sweden) at KONARC.

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AGRICULTURAL MARKETING SERVICE  
SCIENCE AND TECHNOLOGY  
PLANT VARIETY PROTECTION OFFICE  
BELTSVILLE, MD 20705

EXHIBIT C  
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY  
SOYBEAN (*Glycine max* (L.) Merr.)

NAME OF APPLICANT(S)

National Agricultural Research Organization

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

1-1, Kannondai 3-chome, Tsukuba-shi,  
Ibaraki, JAPAN

FOR OFFICIAL USE ONLY

200300229

VARIETY NAME

L-Star

TEMPORARY OR EXPERIMENTAL  
DESIGNATION

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below.

Place a zero in the first box (e.g. 

9	9	9
---	---	---

 or 

0	9
---	---

) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used:

Please answer all questions for your variety; lack of response may delay progress of your application.

A. MORPHOLOGY

Seed Shape:

3
---

1 = Spherical  
(L/W, L/T, and T/W ratios < 1.2)

2 = Spherical-Flattened  
(L/W ratio > 1.2; L/T ratio < 1.2)

3 = Elongate  
(L/T ratio > 1.2; T/W ratio < 1.2)

4 = Elongate-Flattened  
(L/T ratio > 1.2; T/W ratio > 1.2)

Seed Coat Color:

1
---

1 = Yellow

2 = Green

3 = Brown

4 = Black

5 = Other  
(Please Specify) \_\_\_\_\_

Seed Coat Luster:

2
---

1 = Dull

2 = Shiny

Seed Size:

2	7
---	---

grams/100 seeds

Hilum Color:

2
---

1 = Buff  
6 = Black

2 = Yellow

3 = Brown

4 = Gray

5 = Imperfect Black

7 = Other (Please Specify) \_\_\_\_\_

## A. MORPHOLOGY (Continued)

200300229

## Cotyledon Color:

☐ 1 = Yellow      2 = Green

## Seed Protein Peroxidase Activity:

☐ 1 = Low      2 = High

## Hypocotyl Color:

<input type="checkbox"/> 1 = Green (('Evens' or 'Davis'))	<input type="checkbox"/> 2 = Green with Bronze Bands below Cotyledon (('Woodworth' or 'Tracy'))	<input type="checkbox"/> 3 = Light Purple below Cotyledons (('Beeson' or 'Pickett 71'))	<input type="checkbox"/> 4 = Dark Purple extending to unifoliate leaves ('Hodgson', 'Coker', or 'Hampton 266A')
--	---	---	---

## Leaf Shape:

☐ 1 = Lanceolate      2 = Oval      3 = Ovate      4 = Other (Please Specify) \_\_\_\_\_

## Flower Color:

☐ 1 = White      2 = Purple      3 = White with a Purple Throat

## Pod Color:

☐ 1 = Tan      2 = Brown      3 = Black

## Pubescence Color:

☐ 1 = Gray      2 = Brown (Tawny)      3 = Light Tawny

## Plant Habit:

☐ 1 = Determinate      2 = Semi - Determinate      3 = Indeterminate      4 = Intermediate

## Maturity Group:

<input type="checkbox"/> 0	<input type="checkbox"/> 6	1 = 000	2 = 00	3 = 0	4 = I	5 = II
		6 = III	7 = IV	8 = V	9 = VI	10 = VII
		11 = VIII	12 = IX	13 = X	14 = XI	15 = XII

## Maturity Subgroup:

☐ Please enter a value from 0 - 9

## B. DISEASE REACTIONS

0 = Not Tested      1 = Susceptible      2 = Resistant      3 = Tolerant

## Bacterial

☐ 0 Bacterial Pustule (*Xanthomonas campestris* pv. *glycines* (Nakano) Dye)

☐ 0 Bacterial Blight (*Pseudomonas syringae* pv. *glycinea* (Coerper) Young, Dye, & Wilkie)

☐ 0 Wildfire Blight (*Pseudomonas syringae* pv. *tabaci* (Wolf & Foster) Young, Dye, & Wilkie)

## B. DISEASE REACTIONS (Continued)

0 = Not Tested

1 = Susceptible

2 = Resistant

3 = Tolerant

## Fungal

☐ Brown Spot (*Septoria glycines* Hemmi)Frogeye Leaf Spot (*Cercospora sojina* Haru)☐ race 1☐ race 2☐ race 3☐ race 4☐ race 5☐ race 6☐

Other (Please Specify) \_\_\_\_\_

☐ Target Spot (*Corynespora cassiicola* (Berk. & Curt.) Wei)☐ Downey Mildew (*Peronospora trifoliorum* var. *manchurica* (Naum.) Syd. ex Gäum.)☐ Powdery Mildew (*Microsphaera diffusa* Cke. & Pk.)☐ Brown Stem Rot (*Phialophora gregata* (Allington & Chamberlain) W. Gams.)☐ Stem Canker (*Diaporthe phaseolorum* (Cke. & Ell.) Sacc. var. *caulivora* Athow & Caldwell)☐ Pod and Stem Blight (*Diaporthe phaseolorum* (Cke. & Ell.) Sacc. var. *sojae* (Lehman) Wehm.)☐ Purple Seed Stain (*Cercospora kikuchii* (T. Matsu. & Tomoyasu) Gardener)☐ Rhizoctonia Root Rot (*Rhizoctonia solani* Kühn)Phytophthora Root Rot (*Phytophthora megasperma* Drechs. f. sp. *glycinea* (Kuan & Erwin))☐ race 1☐ race 8☐ race 15☐ race 22☐ race 2☐ race 9☐ race 16☐ race 23☐ race 3☐ race 10☐ race 17☐ race 24☐ race 4☐ race 11☐ race 18☐ race 25☐ race 5☐ race 12☐ race 19☐ race 26☐ race 6☐ race 13☐ race 20☐ Other (Please Specify) \_\_\_\_\_☐ race 7☐ race 14☐ race 21☐ Bud Blight (Tobacco Ringspot Virus)☐ Yellow Mosaic (Bean Yellow Mosaic Virus)

B. DISEASE REACTIONS (Continued) 0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Tolerant

☐ Cowpea Mosaic (Cowpea Chlorotic Virus)☐ Pod Mottle (Bean Pod Mottle Virus)☐ 2 Seed Mottle (Soybean Mosaic Virus)

## Nematode

Soybean Cyst Nematode (*Heterodera glycines* Ichinohe)☐ race 1☐ race 4☐ race 9☐ race 2☐ race 5☐ race 14

1

☒ race 3  
(bt:12/20/2004)☐ race 6☐ Other (Please Specify) \_\_\_\_\_☐ Lance Nematode (*Hoplolaimus columbus* Sher)☐ Southern Root Knot Nematode (*Meloidogyne incognita* (Kofoid & White) Chitwood)☐ Northern Root Knot Nematode (*Meloidogyne hapla* Chitwood)☐ Peanut Root Knot Nematode (*Meloidogyne arenaria* (Neal) Chitwood)☐ Reniform Nematode (*Rotylenchus reniformis* Linwood & Olivera)☐ Javanese Nematode (*Meloidogyne javanica* (Treub) Chitwood)☐ 1 Other Nematode (Please Specify) Meloidogyne arenaria

C. PHYSIOLOGICAL RESPONSES 0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Tolerant

☐ Iron Chlorosis on Calcareous Soil☐ Phosphorus☐ Other (Please Specify) \_\_\_\_\_☐ Boron☐ Aluminum☐ Salt☐ Drought

200300229

## D. INSECT REACTIONS

0 = Not Tested

1 = Susceptible

2 = Resistant

3 = Tolerant

☐ 0Mexican Bean Beetle (*Epilachna varivestis* Mulsant)☐ 0Potato Leaf Hopper (*Empoasca fabae* (Harris))☐ 1Other (Please Specify) Common cutworm (per applicant's permission (12/20/2004)lt))

## E. HERBICIDE REACTIONS

0 = Not Tested

1 = Susceptible

2 = Resistant

☐ 0

Metribuzin

☐ 0

Bentazone

☐ 0

Sulfonylurea

☐ 0

Glyphosate

☐ 0

Glufosinate

☐ 0

Pendimethalin

☐ 0

Other (Please Specify) \_\_\_\_\_

## F. TRANSGENIC COMPOSITION

Has the development of the subject variety included the insertion of genetic material from an organism other than a soybean, or, the removal of genetic material from the application variety?

If yes, please complete the following information requests\*. Use additional pages if necessary.

☐ YES☒ NO

1. Please state the vector's name:

2. Please state the vector components:

3. Please describe the genetic material successfully transferred into the subject variety:

4. Please describe the insertion protocol:

\* A literature citation(s) explaining the four information requests above may be an acceptable alternative to completion of the "Transgenic Composition" portion of this form.

## G. BIOCHEMICAL MARKERS

Please describe any biochemical information here, which you believe will be helpful in further describing the subject variety (e.g. Simple Sequence Repeats, Restriction Fragment Length Polymorphisms, Isozymic Characterization). Use additional pages if necessary.

L-Star lacks triple lipxygenase isozymes in its seeds.

12/04/01 WED 12:51 FAX 504 5295

USDA AMS PVPO

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200300229

EL COMMENTS



## Exhibit D

'L-Star' is most similar to 'Fukuyutaka' as described in Exhibit B; however, 'L-Star' carries three recessive alleles of *lox1lox1*, *lox2lox2* and *lox3lox3* for lacking triple lipoxygenase isozymes in its seeds, whereas 'Fukuyutaka' carries the dominant alleles of *Lox1Lox1*, *Lox2Lox2* and *Lox3Lox3* for synthesizing triple lipoxygenase isozymes in its seeds (Fig. 1).

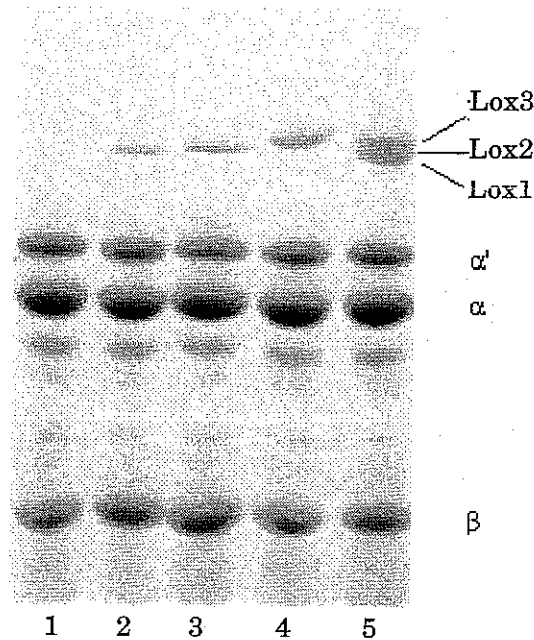


Fig. 1. SDS-PAGE of seed proteins

Lanes 1: 'L-Star', lacking lipoxygenase 1, 2 and 3.  
 Lanes 2: 'Yumeyutaka', lacking lipoxygenase 2 and 3.  
 Lanes 3: 'Kanto 102', lacking lipoxygenase 1 and 3.  
 Lanes 4: 'Kyushu 119' lacking lipoxygenase 1 and 2.  
 Lanes 5: 'Fukuyutaka', having lipoxygenase 1, 2 and 3.  
 Lox1, 2 and 3: Lipoxygenase 1, 2 and 3, respectively.  
 α, α' and β: Subunits of α conglycin

Note: The soybean seed commonly produced by farmers has a grassy or beany flavor. This flavor is not a problem when the grain is used as animal feed, but it can be objectionable to some persons when soybeans are used in food products. The beany flavor is the result of the action of an enzyme called lipoxygenase. As the name implies, the enzyme is involved in the oxidation of lipids or fat, which results in the beany flavor. There are three forms of the enzyme, commonly referred to as lipoxygenase 1, 2, and 3. The three forms occur in common soybean varieties grown by farmers.

Table 1. Reaction of  $F_3$ ,  $F_5$ , and  $F_8$  generations of D99-2018 to races 1 or 2 of *Phytophthora sojae*.

	Race 1		Race 2	
	Dead	Alive	Dead	Alive
	Number of plants			
Bedford	35	0	33	0
D99-2018 $F_3$	0	24	0	23
Bedford			36	0
D99-2018 $F_5$			0	100
Bedford	33	0	34	0
D99-2018 $F_8$	0	93	0	95

D99-2018 was selected in the  $F_5$  generation from Bedford (7) x Altona in 1999.

Table 2. Reaction of the F<sub>8</sub> generation of D99-2018 to races 3 and 14 of SCN.

	Race 3 rating					Mean (SE)	Race 14 rating					Mean (SE)
	1	2	3	4	5		1	2	3	4	5	
	-Number of plants-						-Number of plants-					
Hutcheson							1	6				4.9 (0.14)
Bedford	6					1.0	1	8	3			3.2 (0.17)
D99-2018	6					1.0	2	4				2.7 (0.21)
Essex				1	5	4.8 (0.17)						

Table 3. Seed yield of Bedford and D99-2018 on clay soil at Stoneville, MS.

	2000	2001	2002	3-year mean
	Bu/A			
Bedford	18.8	14.9	48.6	27.4
D99-2018	25.8*	31.1**	56.1**	37.7
Difference	7.0	16.2	7.5	10.3
LSD .05	5.8	10.1	5.3	
LSD .01	7.7	13.4	7.1	
CV (%)	15.3	18.8	5.8	

\* Significant at the 5% level of probability; \*\* Significant at the 1% level of probability.

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EXHIBIT E  
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) National Agricultural Research Organization	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME L-Star
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 1-1, Kannondai 3-Chome, Tsukuba-Shi, Ibaraki 305-8517 Japan	5. TELEPHONE (include area code) +81-029-838-8998 (Ext: 2/18/2005) +81-29-838-8511 or +81-029-838-8511 (Ext: 2/18/2005)	6. FAX (include area code) +81-29-838-8980
7. PVPO NUMBER 200300229		

8. Does the applicant own all rights to the variety? Mark an "X" in appropriate block. If no, please explain. ☒ YES ☐ NO9. Is the applicant (individual or company) a U.S. national or U.S. based company? ☐ YES ☒ NO

If no, give name of country Japan

10. Is the applicant the original owner? ☒ YES ☐ NO If no, please answer one of the following:

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?

☐ YES ☐ NO If no, give name of country

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

☐ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (if needed, use reverse for extra space):

## PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

- If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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